Public Health Emergency Management

Health Objectives for the Year 2010: Reduce the adverse public health impact caused by chemical accidents and natural disasters.

Health Implications

Whether a disaster in the community is caused by a natural event (tornado, flood, earthquake, or snowstorm), accidently by people (chemical spill, large fire, or chemical air release), or purposely by people (a terroristic chemical or biological event) the results are very similar. The resources of the entire community can be taxed beyond their limits. Basic needs, such as shelter, food, and water, may be taken away. The public health implications are numerous and complex. Those things citizens take for granted that provide a healthy community may suddenly become unavailable.

Natural Disasters

Natural disasters usually involve the destruction of property and the displacement of people. Power is often lost, and communications may be severely hampered. Transportation is disrupted. Water supplies may become contaminated. Sewage systems may fail. Food, which is normally protected, becomes an attractant to insects and vermin. Many citizens maybe injured, and there may be loss of life. When these events occur, the community becomes more vulnerable to the spread of disease. Destruction of property also opens up the possibility that hazardous materials may be released into the environment. When chemical containment and safety systems fail, these materials may cause both acute and long-term adverse health effects to those who are exposed to the material.

Providing shelter for citizens who are displaced from their homes creates unique health problems. Because shelter needs may extend over several days and even weeks, sanitation in the shelter must be monitored closely to control the spread of illness and parasites. The medical services in the community can be taxed beyond limits. Many injured may need care. The stress of such events typically cause more heart attacks and mental disorders than normal, which place an additional burden on the health system. The elderly and those with severe chronic health problems are particularly vulnerable and will require special attention to assure the maintenance of their health status.

A public health issue in emergency response that is often overlooked is that of animal control. Pets and livestock become separated from their owners and are forced to fend for themselves in the environment. Many animals may become afraid and defensive, creating

Table 1. Public Health Emergency Management Indicators

	Lancaster Recent	Lancaster Objective 2010	Nebraska Recent	Nebraska Objective 2010	National Recent	National Objective 2010
Increase the capacity of the community to reduce or avoid public health consequences caused by chemical and biological releases and natural disasters (developmental)	--	--	--	--	26 objectives established[1]	reach all 26 objectives[1]
Plans are approved by elected officials and in place that assure that the health of the community is protected	LEOP plan[2]	annual exercise & review	53.8[3]	--	--	--
Establish and implement standards that meet or exceed national standards such as NFPA and assure protection of public health in key areas of training, medical monitoring, incident command, emergency operations, mass casualties, sanitation, shelter and essential services	0[4]	standards implemented in all areas	--	--	--	--
Percentage of key health professionals identified in the training standards who are adequately trained to handle disasters in the community	--[5]	100.0	--	--	--	--
Percentage of identified health delivery service resources available to handle disasters in the community	--[5]	100.0	--	--	--	--
Percent of population living in moderate to high risk areas for hazardous chemical releases as defined by probability and consequences analysis	80.0[6]	20.0	41.0[7]	--	--	--
Percent of population with knowledge of how to respond to emergency situations	--[5]	75.0	--	--	--	--
Percent of population in vulnerable zones who know how to respond in the event of emergency chemical release	--[5]	90.0	--	--	--	--
Percent of population trained in CPR	--[8]	50.0	--	--	--	--
Percent of population trained in basic first aid	--[8]	50.0	--	--	--	--

an increase in numbers of animal bites. The potential for development of a rabid animal population increases.

All of these natural disaster results may persist over a long period of time until the community can recover. Complete recovery could take several months up to years.

Chemical Releases

Accidental releases of chemicals into the environment have varying effects on a community, depending on the material released and the media it is released into (air, water, or soil). Releases into the water and soil have much less immediate public health impact than release into the air. Air releases of toxic chemicals nearly always require an emergency response to assure protection of the public. Depending on the type and quantity of material released, the public health impact can include dermatitis, respiratory distress, neurological damage, and damage to vital organs. The effects range from mild irritation to coma and death. In some instances exposure to a toxic chemical can lead to a debilitating illness or cancer many years later.

Although an airborne toxic release creates an immediate or acute problem, once the release is contained, the immediate effects become short-lived. However, during the time the event is occurring, the health risks are far higher, with the probability that injury and death will be greater, and in some instances significantly greater. These events can last from hours to several days. Except when a chemical contaminates the environment or when a significant proportion of the population is harmed, the demand for disaster resources tends to be less than in a natural disaster. Disruption of utilities may also be considerably less and sheltering may be needed for a much shorter duration.

Finally, cleanup of a release site has a significant impact on public health. With most toxic chemicals, it is necessary to remove all contaminants and perform environmental testing to assure that no threat to public health remains. In addition, depending on the chemical exposure, those people exposed may require medical monitoring over an extended period of time.

Terrorism

Acts of terrorism may take place in the form of an exploding bomb, the intentional release of a highly toxic chemical, or the release of a deadly pathogenic organism. The effects of an exploding bomb are similar to the effects of a natural disaster, only more limited in scope. Property damage, injury, and death are the prime objectives of the terrorist – to cause political change. In addition, the terrorist usually has a specific target in mind.

Terrorists who use chemical and biological agents as terroristic weapons want to make a statement by killing and injuring people and causing terror. Damage to property is not of concern and in fact may be something the terrorist wants to avoid. In either case, with one exception, biological and chemical attacks are similar to accidental air releases of highly toxic materials. The exception is that chemical attacks generally have an immediate impact that overpowers the emergency-response capability, where as a biological-agent attack has a delayed effect. Typically, there may not be an emergency response to a biological-agent attack unless the perpetrator announces the attack at or before the time the attack occurs. The public health response to a chemical attack is the same as for a toxic air release, while the response to a biological attack is much more extensive and will involves all facets of the public health delivery system.

In any event, the health effects of a chemical or biological terrorist attack range from severe dermatitis, severe respiratory distress, and severe neurological damage to damage of vital organs and death. Where biological agents are used, disease may be spread by person-to-person contact through airborne aerosols or water. The potential exists for many people to be injured, made ill, and killed.

Current Status and Trends

Natural Disasters

Determining the risk presented by a natural disaster is difficult at best. By far the most serious natural disaster threat in Lancaster County is from tornadoes, which occur frequently in the Midwest. Most occur during the months of May through early July. Data from the Lincoln–Lancaster County Emergency Management Office show that from 1950 to 1998 there have been thirty tornados in Lancaster County.

Flooding occurs on a regular basis in Lincoln and Lancaster County. Because of the extensive flood-control work done over the years, the chances of a disastrous flood have been reduced. Despite those efforts, flooding is considered to be the most likely naturally occurring disaster in the community. One hundred-year and 500 year flood data indicate the worst flooding scenarios. Table 2 shows the numbers of residences, businesses, and industries that would be adversely effected by 100-and 500-year flood.

Table 2: Number of residences, businesses and industries affected by flooding in Lincoln.

	100-year flood	500-year flood
Residences		
Single Family	2,122	2,788
Duplexes	149	209
Multiple Family	99	109
Businesses	306	366
Industries	340	418

In 1996 an ice and snow storm caused significant concern in the community. Power and communications were disrupted for up to five days. A serious public health concern was hypothermia, especially for the elderly. In addition, some immigrant families were forced to find alternate sources of heat. There was a serious concern they would use charcoal grills, propane heaters, and other heat sources not properly vented to the outside air and then be exposed to carbon monoxide.

Chemical Releases

From September 1, 1998, to the same date in 1999, LLCHD staff responded to 178 hazardous material spills, releases, and abandonments. This represents a 65% increase over the previous year. Figure 1 shows the annual response rate since September 1993. Since 1993 the number of emergency responses has increased nearly ten-fold, from 18 to 178. Fortunately, few of these responses involved a very serious public health threat. Lancaster County has 22 facilities that participate in the mandatory EPA Risk Management Program because they store sufficient amounts of extremely hazardous substances such as chlorine and ammonia. Lancaster County is also considered by many to be the number one, two hazardous chemical transportation hub in the United States. Many shipments of hazardous materials go through the county by truck, rail, and pipeline each day. According to a Burlington Northern Santa Fe representative, approximately 46,000 shipments of hazardous materials go through the county rail each year. The chances are very high that a serious accident involving hazardous materials will occur in Lincoln or Lancaster County.

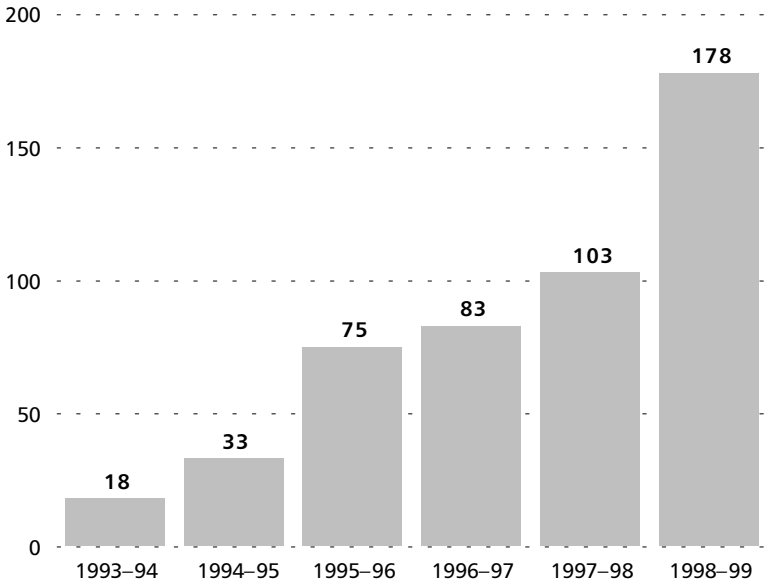

Figure 1: LLCHD Annual Emergency Responses.

Terrorist Threats

Lincoln is among 250 cities identified by the U.S. Departments of Defense and Justice identified as a potential target for terroristic activity. As the seat of state government, the location of a major state educational institution with a nationally recognized football team, and the headquarters of several federal offices, including a federal court house and immigration service office, Lincoln is considered to be a site that would attract terrorist activity. In addition, Lincoln has an abortion clinic that has been the target of controversy in the news and on the Internet. Abortion clinics are high on the list of potential terrorist targets.

Addressing the Public Health Threat

The best defense against the adverse effects of natural disasters, toxic chemical accidents, and terrorist attacks is adequate planning, preparation and exercises. The planning should include methods for rapidly deploying resources that maintain the social fabric of the community and ways to provide information to the community to reduce the adverse effects of the event. The Lancaster County Office of Emergency Management has the responsibility of maintaining a Local Emergency Operating Plan. The Local Emergency Planning Committee, set up under federal Emergency Planning and Community Right to Know Act regulations, has the responsibility for planning for hazardous chemical releases. Both of these bodies bring various sectors of the community together in the planning processes. Public health must remain an integral part of those planning processes.

Health Disparities

When disasters strike a community, those citizens who are at greatest risk are sensitive populations and the homebound, frail, and elderly, who cannot adequately protect themselves. Sensitive populations include people in facilities like hospitals, prisons, nursing homes, and even churches, schools, and recreation facilities – any place where people rely on others to determine their safety. In events involving chemical exposures, in addition to those groups already mentioned, small children and those who suffer from chronic respiratory illnesses become vulnerable to the effects of the chemicals released. Much of the public health risk is dependent on the nature of the disaster, but one thing is certain: a disaster does not choose its victims, and every segment of the population will be adversely affected in some way.

Recommendations

The nature of assuring public health in the event of an emergency is one of making sure that the infrastructure of the community includes adequate resources, skills, planning, and ability to respond effectively in a timely manner. In addition, the community infrastructure needs to be capable of activities that actively monitor the capacity to respond, reduce risk, and prevent potential disasters from occurring. All the recommendations in this area are focused on establishing and maintaining the necessary infrastructure.

Whether disaster events are naturally occurring or human caused, they have a significant impact on public health. It is vital to the community that health issues be addressed through the planning process. Active participation by health professionals in any disaster planning and prevention activities is strongly recommended.

The public health infrastructure must be prepared to reduce the public health risk in the community to the greatest extent possible during a disaster. Agencies and institutions must prepare by

- Assure that personnel are training to work successfully in disaster situations regardless of the type of disaster that occurs.
- Periodically review and update plans and then exercise those plans on a regular basis to assure their continued effectiveness.
- Have the necessary procedures in place to handle mass casualty incidents in a caring and efficient manner.
- Assure adequate equipment necessary to handle any disaster event and sufficient medical supplies will be available in the community to work through the first 48 hours of the disaster.
- Obtain a mobile public health emergency response support vehicle to support field operations in chemical accidents, epidemiological investigations, and natural and manmade disasters and to serve as a mobile coordination center to obtain state and federal assistance.
- Assure adequate epidemiologically trained staff will be available to support on-going investigations and monitoring of health during disaster events.
- Assure that emergency rooms will have the capacity and capability to decontaminate and treat victims of chemical accidents and terrorism.

Notes

Related discussion or indicators are located in the chapters on *Safe Food*, *Water Management*, *Clean Outdoor Air*, *Toxic and Hazardous Materials*, and *Waste Management*.

Table 1

-- Currently no data source.

1. United States Department of Defense, Domestic Preparedness Report, *Defense Against Weapons of Mass Destruction*, 1998.
2. Local Emergency Operations Plan (LEOP) for Lancaster County, August 1996. Revision currently being conducted by Lincoln–Lancaster County of Office Management.
3. Nebraska Emergency Management Agency, *Status of Nebraska Local Emergency Planning Committees*, December 2, 1999. Represents the percentage of counties within Nebraska that have approved plans in place to protect the community.
4. In Lancaster County there are currently no standards developed to assure protection of public health in key areas of training, medical monitoring, incident command, emergency operations, mass casualties, sanitation, shelter, and essential services.
5. Currently no data source. Could be obtained through development of a community surveillance system targeted at various environmental topics.
6. Estimated by LLCHD field staff based on work with RMP, Tier II and transportation modeling. Based on risk analysis using RMP methodology and data from RMP, Tier II, and transportation sources.
7. Nebraska Department of Environmental Quality, *Hazard Screening of Anhydrous Ammonia in Nebraska, June 27, 1995*. 41% of the population in Nebraska are exposed to Anhydrous Ammonia at their place of residence. Greater than 90% of Nebraskans are at risk of exposure to Anhydrous Ammonia due its transport along key transportation corridors.
8. Currently no data source. Could be obtained through development of a community surveillance system, or through a joint effort with the American Red Cross and other organizations that certify individuals in CPR and basic first aid.